

## Patent claims

1. A process for preparation of impact-resistant polystyrene from diene monomers and from styrene monomers via anionic polymerization, where
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- 1) in a stage 1) a rubber solution is prepared from the diene monomers, or from the diene monomers and from the styrene monomers, using an alkali metal organyl compound as initiator and with concomitant use of a solvent, and then
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- 2) in a stage 2), styrene monomer is added to the rubber solution, and the resultant mixture is polymerized anionically to give the impact-resistant polystyrene,
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- and where, after stage 1) and prior to stage 2), an organylaluminum compound and an alkali metal hydride are added to the rubber solution.
2. The process according to claim 1, wherein butadiene is used as diene monomer and styrene is used as styrene monomer.
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3. The process according to claims 1 to 2, wherein the rubber has been selected from polybutadiene and styrene-butadiene block copolymers.
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4. The process according to claims 1 to 3, wherein an organyllithium compound is used as alkali metal organyl compound.
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5. The process according to claims 1 to 4, wherein triethylaluminum (TEA) or triisobutylaluminum (TIBA) or a mixture of these is used as organylaluminum compound.
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6. The process according to claims 1 to 5, wherein sodium hydride is used as alkali metal hydride.
7. The process according to claims 1 to 6, wherein concomitant use is made of tetrahydrofuran during preparation of the rubber solution.
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8. The process according to claims 1 to 7, wherein, prior to stage 2), the rubber solution is diluted with styrene monomer.
9. The process according to claims 1 to 8, wherein the polymerization is carried out in first stage 1) batchwise and in stage 2) continuously.

10. An impact-resistant polystyrene, obtainable by the process according to claims 1 to 9.
- 5 11. Use of the impact-resistant polystyrene according to claim 10 for production of moldings, of foils, of fibers, or of foams.
12. A molding, a foil, a fiber, or a foam composed of impact-resistant polystyrene according to claim 10.